Soil: The Foundation of Terrestrial Ecosystems

Rob Quarles, Pflugerville High School

Soil Sampling

Day 1: Collect soil sample, place in tray, dry overnight.

Day 2: Collect second soil sample from your site.

- Measure 125 ml of this sample into a large beaker and add 625 ml of tap water.
- Mix thoroughly and allow to settle for at least 30 min. This supernatant will be used for the Nutrient Analysis.

Soil Texture

1. Fill a 100 ml cylinder (clear or very translucent) with approximately 20 ml of soil that has been dried overnight and add water to bring the total volume up to 100 ml. It helps to break the soil up as much as possible.
2. Cover and shake the cylinder thoroughly to mix the water and soil.
3. Allow the mixture to settle.
4. Note the volume of settled material after 30 sec. This is the volume of sand.
5. The additional volume that settles within 30 min is the silt portion.
6. Allow the sample to settle a further 24-48 hrs, until the water is nearly clear. The top layer of material is the clay portion of the soil. At this point, you might be able to recognize three separate layers, top to bottom, clay, silt, and coarse material (sand).
7. Calculate the percent for each of these components. Note that the total is the volume of soil-particle containing solution, not 100 ml. Thus, the percent of silt, sand, and clay should add up to 100%.
8. Use the "Soil Triangle" at www.rquarles.com to determine your soil type.

Water Retention

*For this test, you will test your soil and one of the three pure soil components.***Nutrient Analysi**

1. Fill a 3 in. pot to within 1 cm. of the top with soil. (This is approximately 200 ml).
2. Slowly add 100 ml of water, and catch and measure what passes through the soil. From this data, determine the amount of water retained by the soil. (Note: if it has recently rained, you may want to repeat this test on another, drier, day)

Chemical Analysis

pH

1. Fill the pH test container to the soil fill line with soil.
2. Add the contents of one green capsule.
3. Add water to the water fill line, replace the cap and shake well to mix thoroughly.
4. Wait one minute, then determine the pH by comparing the color of the solution to the color chart on the container. Record the pH and clean out the container thoroughly.

Nutrient Analysis

For nitrogen, potassium and phosphorous, use the supernatant from the sample you prepared at the beginning of class.

1. Fill the appropriate test container to the fill line, add the capsule, and shake well to mix thoroughly.
2. Wait ten minutes, and then determine the nutrient level by comparing the color to the chart on the container.